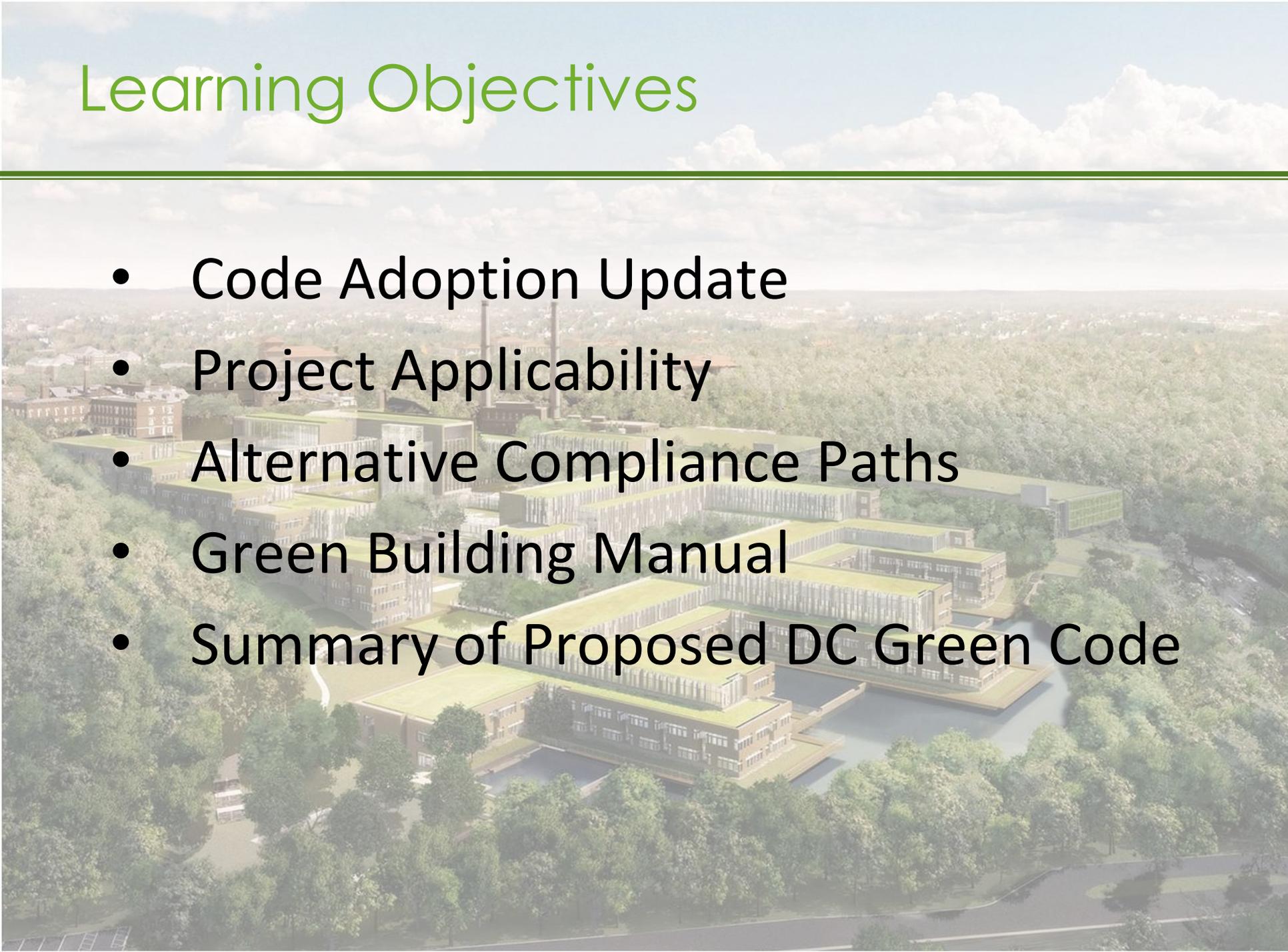




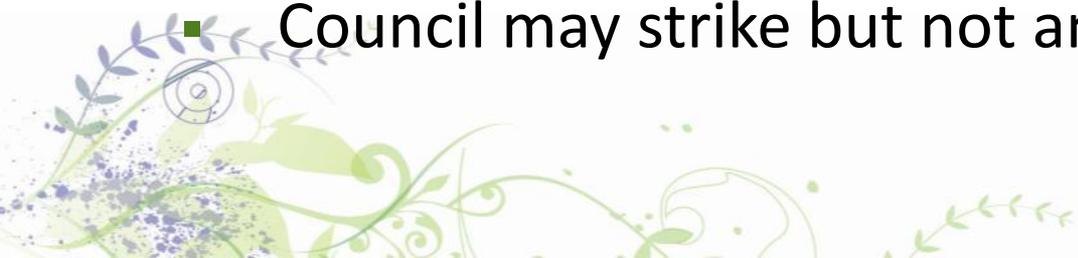
The D.C. Green Construction Code

Learning Objectives

- Code Adoption Update
 - Project Applicability
 - Alternative Compliance Paths
 - Green Building Manual
 - Summary of Proposed DC Green Code
- 
- An aerial photograph of a large, modern building complex, likely a university or government campus. The buildings are multi-story and feature prominent green roofs. The complex is surrounded by lush green trees and a body of water, possibly a lake or a large pond. The sky is blue with scattered white clouds. The overall scene is bright and clear, suggesting a sunny day.

Code Adoption

- Construction Code Coordinating Board (CCCB)
- CCCB oversees Technical Advisory Groups (TAGs)
- Public comment periods (1st period extended until February; 2nd period ended June)
- CCCB to publish 3rd revision and send to Council
- 2013 DC Construction Codes on track to be adopted Dec. 2013 or early Jan. 2014
- 45 legislative days for Council to act
 - Code Hearings
 - Council may strike but not amend



Transitory Provisions

- 2013 Construction Codes effective when published in the DC Register as Final Rulemaking
- Exceptions (Section 123 Building Code)
 - Projects with existing valid building permits
 - Projects with existing filed application
 - Projects with existing design contracts
 - Tenant Layout Permits for built Core and Shell



Goals of the New Codes

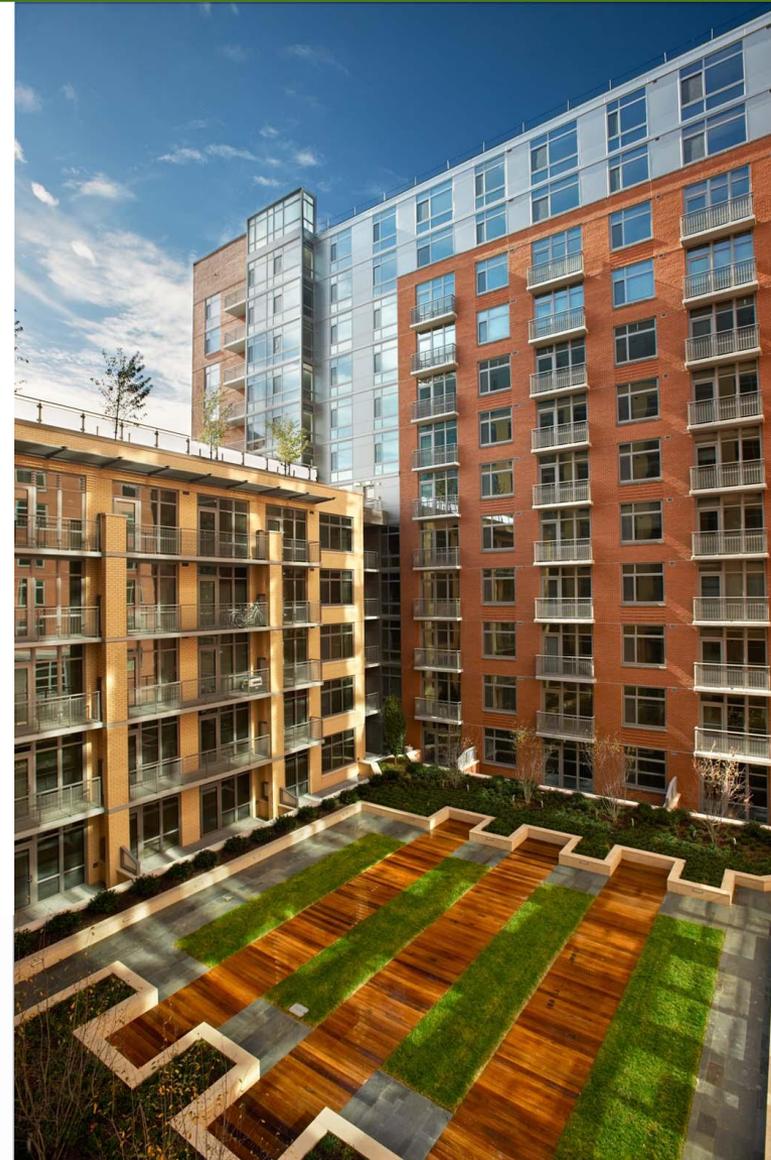


- Green the District's Construction Codes to the maximum extent practicable
- Codify the best practices currently followed by green building leaders in the District
- Other important goals and considerations
 - Unique DC characteristics, policies and statutes
 - Use of modern technology
 - Fire and life safety
 - Accessibility



Voting Green Tag Members

- ❖ *Bill Updike, DDOE*
- ❖ *Joe Winters, HOK*
- ❖ *Frank Mobilio, Jones Lang Lasalle*
- ❖ *Patrick Kunze, GHT Engineering*
- ❖ *Fulya Kocak, Clark Construction*
- ❖ *Ethan Landis, Landis Construction*
- ❖ *John Otto, Akridge*
- ❖ *Harrison Shelton, DCRA*
- ❖ *Nicola Whiteman, AOBA*



Other Active Green Tag Members

- ❖ *Dan Moring, IBC Engineering*
- ❖ *Ryan Meres, IMT*
- ❖ *Michael Walton, Perkins + Will*
- ❖ *Robert Hershey, Consultant*
- ❖ *Marc Fetterman, Consultant*
- ❖ *Anica Landreneau, HOK*
- ❖ *Jill Stern, DCRA*
- ❖ *Heather Langford, USGBC*
- ❖ *Jeremy Sigmon, USGBC*
- ❖ *Roger Chang, WRL Design*



2013 DC Green Construction Code

- Applies to the design, construction, addition, alteration, relocation, replacement, repair, equipment, building site, maintenance, removal, razing, demolition of buildings or structures:
 - Non-residential projects (10,000 SF and larger)
 - Multifamily residential 4 stories and larger (and 10,000 SF and larger)
 - Demolition (10,000 SF or larger)
 - Site Work (1,000 SF or larger)



Alternative Compliance Paths

- ✓ Green Building Act
- ✓ ASHRAE 189.1
- ✓ LEED Certification
- ✓ Enterprise Green Communities
- ✓ ICC-700



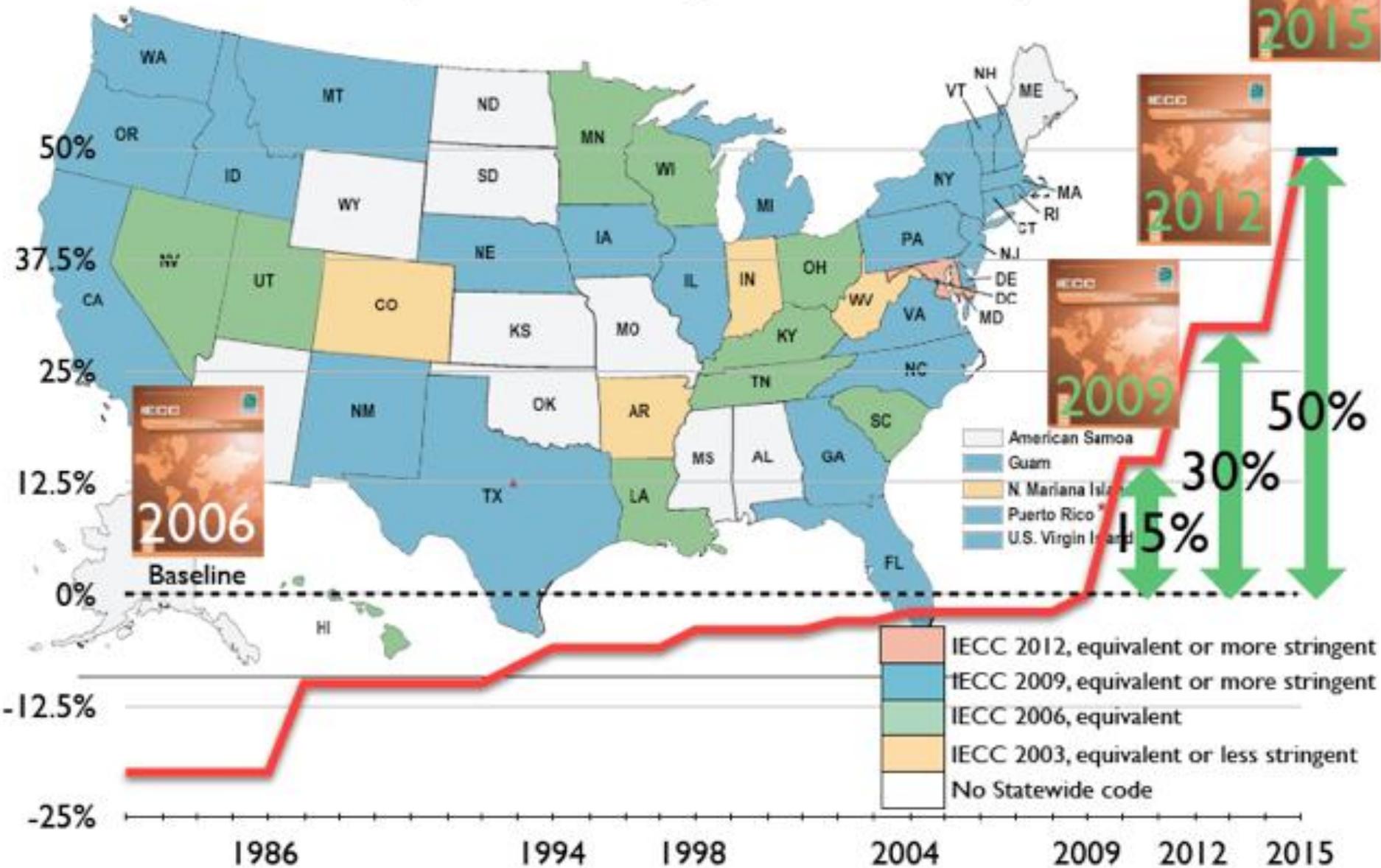
2013 DC Energy Conservation Code

- 2012 International Energy Conservation Code, Amended
- Model 2006 IECC to the 2012 IECC roughly 30% more energy efficient through increased requirements for air sealing, insulation levels, and building systems
- Is applicable to the majority of projects
- Code as two separate divisions
 - Commercial Buildings
 - Residential Buildings



Residential Energy Codes Improving FASTER...

Relative to 2006 IECC (International Energy Conservation Code) Baseline



Interpreted from: www.energycodes.gov; Jan. 2012. J.Brew, RMI

Comparison of Residential* Energy Codes & Standards

(on a relative HERS index)

* Single Family, Multifamily (low rise)

Legend

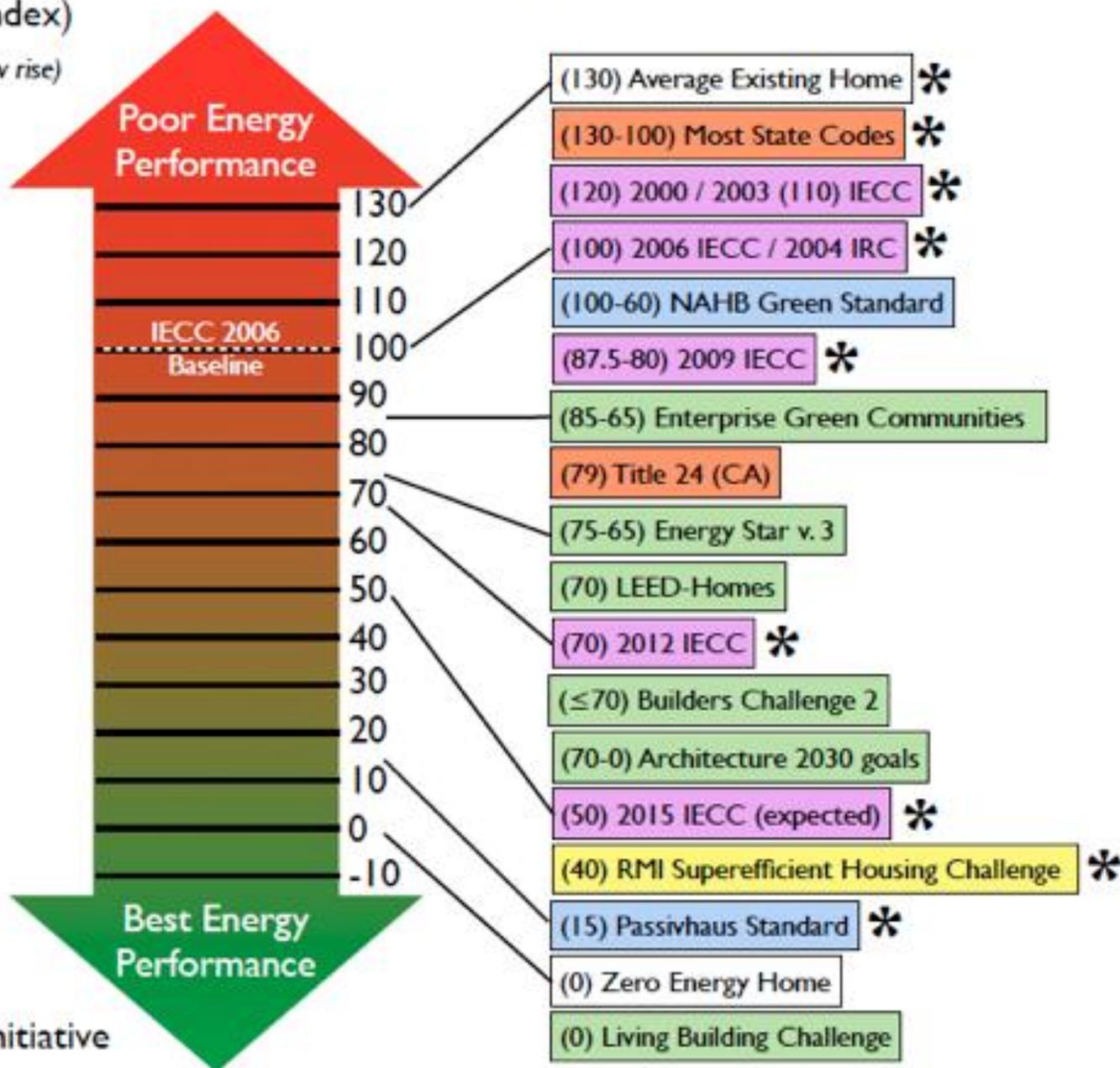
Model Codes

Codes

Standards

Guidelines

* Excludes Photovoltaic Energy



Superefficient Housing Initiative

Site Development & Land Use



- ✓ **Predesign Site Inventory & Assessment** -- Soils & Invasive/Native plant species
- ✓ **Stormwater Requirements Removed** -- overlap with new stormwater regulations
- ✓ **Landscape Irrigation Systems** -- 50% design reductions in landscaping water use
- ✓ **Management of Vegetation, Soils and Erosion Control**
 - ✓ Soil reuse and restoration
 - ✓ Containment and removal of invasive plants
 - ✓ 50% native planting requirement. Remainder can be adaptive
- ✓ **Building Site Waste Management** -- 75% diversion of site debris
- ✓ **Heat Island Mitigation** – 50% of site hardscaping
 - ✓ SRI of 0.30 or greater, shading by structures & trees, pervious paving, etc.
- ✓ **Light Pollution Control Requirements**



Material Resource Conservation & Efficiency



- ✓ **Construction Material Management** -- Storage and handling of materials
- ✓ **Construction Waste Management** -- 50% construction waste recycling
- ✓ **Material Selection**
 - ✓ Whole building Life Cycle Assessment (LCA)
 - ✓ 40% of materials shall be (counted more than once):
 - ❖ Made with recycled content
 - ❖ Used materials and components
 - ❖ Bio-based materials
 - ❖ Locally manufactured (500 mile radius)
 - ❖ Recyclable materials
- ✓ **Lamps** – Provisions for low-mercury lamps
- ✓ **Building Envelope Moisture Control** -- Provisions for envelope inspections



Energy Conservation



- ✓ **Modeled Performance Path** -- based on zEPI calculation
- ✓ **Prescriptive Path**
 - ✓ Building Envelope
 - ✓ Mechanical Systems
 - ✓ Water Heating Systems
 - ✓ Lighting + Electrical Power Systems
 - ✓ Appliances and Equipment
- ✓ **Energy Metering and Monitoring Requirements**
 - ✓ Energy load isolation
 - ✓ Sub-metering for non-residential projects > 50,000 SF
- ✓ **Auto Demand-Response Infrastructure** -- HVAC
- ✓ **Building Envelope Systems** – Insulation requirements during roof replacement



Energy Conservation



✓ **Building Mechanical Systems**

- ✓ Duct air leakage testing
- ✓ Variable air volume (VAV) fan controls – 5 HP and above
- ✓ Exhaust air guidance – proper design and VAVs or heat recovery
- ✓ HVAC controls in Group R-1

✓ **Building Service Water Systems** -- Water heating controls in dwelling units

✓ **Building Electrical Power and Lighting Systems**

- ✓ Sleeping unit lighting controls in hotels
- ✓ Occupancy light reduction controls
- ✓ Exterior lighting reductions
- ✓ Automatic daylight and plug load controls



Energy Conservation



✓ **Appliances and Equipment**

- ✓ Standby mode for elevators
- ✓ Variable speed escalators
- ✓ 50% of commercial food service equipment to be Energy Star
- ✓ Variable speed and shut off provisions for conveyors

✓ **Renewable Energy Systems** – Section stricken from model code (appendix A)

✓ **Energy Systems Commissioning** -- removed the post-occupancy requirements from the model code



Water Resource Conservation



✓ **Fixtures, Fittings, Equipment and Appliances**

- ✓ Guidance for flow rates and reduced consumption
- ✓ Energy Star requirements for appliances
- ✓ Efficiency guidance for water-powered pumps, vehicle washing facilities

✓ **HVAC Systems and Equipment**

- ✓ Prohibition of once-through cooling
- ✓ Guidance for cooling towers

✓ **Water Treatment Devices and Equipment**

- ✓ Water softener and reverse osmosis efficiency guidance
- ✓ Onsite reclaimed water treatment systems guidance



Water Resource Conservation



- ✓ **Metering** – Requirements for water metering and submetering
- ✓ **Nonpotable Water Requirements** -- stricken, wasn't seen as necessary
- ✓ **Rainwater Collection and Distribution** – Amended and moved to Plumbing Code
- ✓ **Gray Water Systems** – stricken due to guidance in Plumbing Code
- ✓ **Reclaimed Water Systems** -- stricken (not available in DC)



Indoor Environmental Quality



- ✓ **Building Construction Features** -- Guidance for air handling and filter access
- ✓ **HVAC Systems** -- Guidance for construction phase and post-construction air filtration
- ✓ **Specific IAQ Control** – Stricken, requirement for IAQ testing thought to be too much
- ✓ **Material Emissions and Pollutant Control**
 - ✓ Guidance for formaldehyde limits on composite wood products
 - ✓ Guidance for VOC emission limits for flooring, ceiling tiles/walls, and insulation
- ✓ **Acoustics** -- Section stricken (poorly worded and being covered elsewhere in DC code)
- ✓ **Daylighting** -- Daylighting section was revised and moved to Appendix A



Commissioning, O&M



✓ **Scope**

- ✓ Altered the commissioning plan -- focus on “active” systems

- ✓ **Approved Agency** -- Guidance on “approved agencies” for commissioning

- ✓ **Commissioning** -- Commissioning records and reporting to be provided to the owner, and made available to the code official upon request

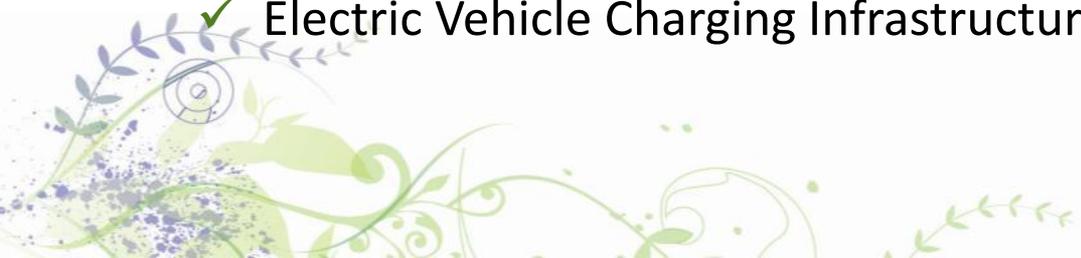
- ✓ **Building Operations and Maintenance** – section stricken from code



Electives– Appendix A

Site Project Electives

- ✓ Wildlife Corridor
- ✓ Infill Site
- ✓ Brownfield Site
- ✓ Site Restoration
- ✓ Mixed-use Development
- ✓ Changing and Shower Facilities
- ✓ Long-term Bicycle Storage and Parking
- ✓ Heat Island Mitigation
- ✓ Site Hardscape (2 electives)
- ✓ Green Roof Coverage (3 electives)
- ✓ Native Plant Landscaping (2 electives)
- ✓ Electric Vehicle Charging Infrastructure



Electives– Appendix A

Material Resource Conservation & Efficiency Project Electives

- ✓ Waste Management (70% recycling)
- ✓ Construction Waste Landfill Maximum <math><4 \text{ lbs/SF}</math> of landfill waste)
- ✓ Material Selection, 2 electives, 50% & 75% green materials
- ✓ Service Life Plan
- ✓ Design for Deconstruction & Building Reuse
- ✓ Existing Building Reuse
- ✓ Historic Building Reuse



Electives– Appendix A

Energy Conservation, Efficiency & Earth Atmospheric Quality

- ✓ zEPI reduction electives (10 electives 5-51 point reductions)
- ✓ Mechanical Systems (10% greater efficiencies than IECC/duct insulation)
- ✓ Service Water Heating (10% more efficiency than IECC)
- ✓ Lighting Systems (10% greater efficiencies)
- ✓ Passive Design
- ✓ On Site Renewable Energy (3 electives, 5%, 10%, 20%)
- ✓ Energy Display
- ✓ Auto Demand Response for Lighting
- ✓ Insulation and Fenestration (10% greater efficiencies)
- ✓ Permanent Shading Devices for Fenestration



Electives– Appendix A

Energy Conservation, Efficiency & Earth Atmospheric Quality

- ✓ Air Leakage Testing (2 electives, 0.25 cfm/ft² & 0.15 cfm/ft²)
- ✓ Waste Water Heat Recovery System
- ✓ Circulating Hot Water System
- ✓ Exterior Lighting and Signage Shutoff (auto shutoffs 1 hour after COB)
- ✓ Energy Star Equipment (100% Energy Star)
- ✓ Lighting Power Density Reductions (5 electives, 5%-35% reductions)
- ✓ Green Power Purchase (100% green power)
- ✓ EV Charging



Electives– Appendix A

Water Resource Conservation and Efficiency

- ✓ Onsite Waste Water Treatment
- ✓ Alternate Onsite Nonpotable Water for :
 - ✓ Outdoor Hose Connections
 - ✓ Plumbing Fixture Flushing
 - ✓ Industrial Process Makeup Water
 - ✓ Cooling Tower Makeup Water
- ✓ Gray Water Collection
- ✓ Condensate Drainage Recovery
- ✓ Wet-hood Exhaust Scrubber System



Electives– Appendix A

Indoor Environmental Quality and Comfort

- ✓ VOC Emissions
 - ✓ Flooring
 - ✓ Ceiling Systems
 - ✓ Wall Systems
- ✓ Total VOC Limit (50% of all materials with TVOC limit of $<500 \text{ ug/m}^3$)
- ✓ Views to Building Exterior (2 electives, 50% and 75% views)
- ✓ Daylighting (3 electives, 25%, 50% & 75% of net floor area daylit)
- ✓ Post-Construction:
 - ✓ Pre-Occupancy Baseline IAQ Testing, or
 - ✓ Pre-Occupancy Flush Out



Standard Comparison

Figure 1. IEQ Breadth

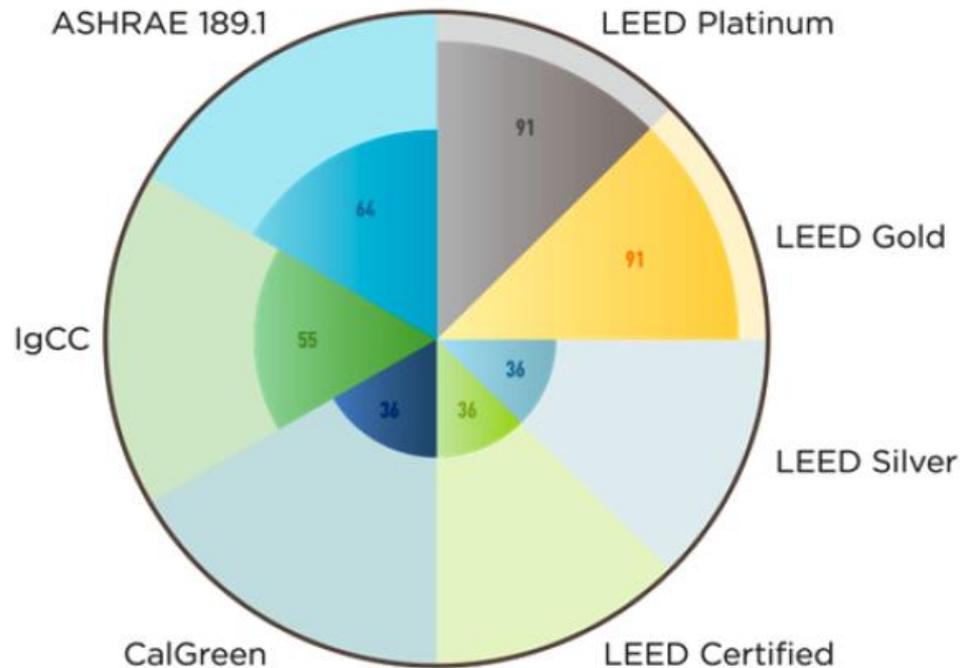
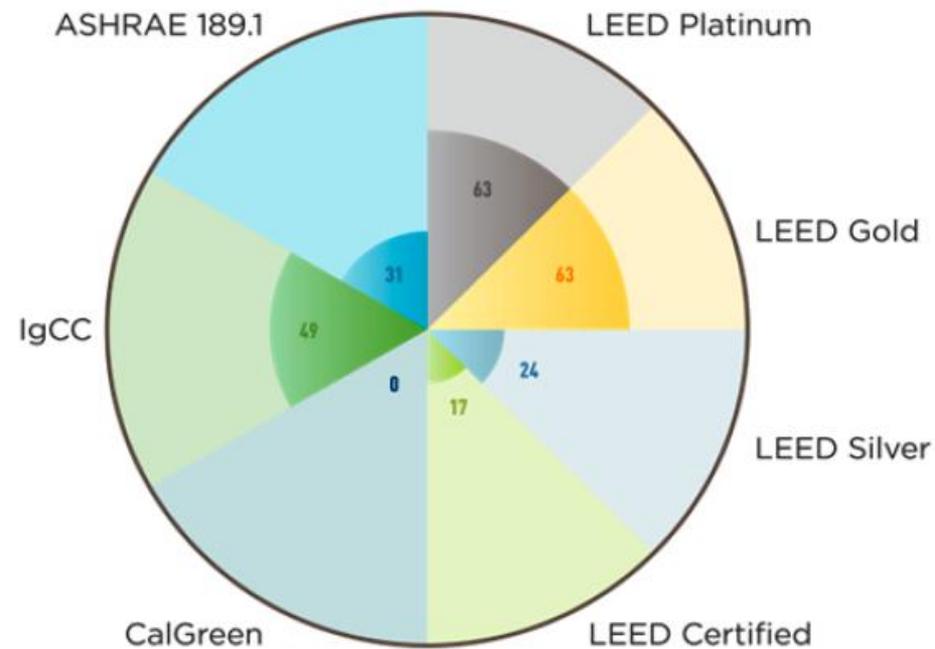


Figure 2. MR Breadth



Reference: Lane Burt and Jeremy Sigmon, USGBC, and Brian Dean and Charlie Haack, ICF International, "Green" Codes and Rating Systems: A Framework for Evaluating the Tools and the Measuring Sticks to Create Better Buildings (ACEEE, 2012), 3-33.

Standard Comparison

Figure 3. SS Breadth

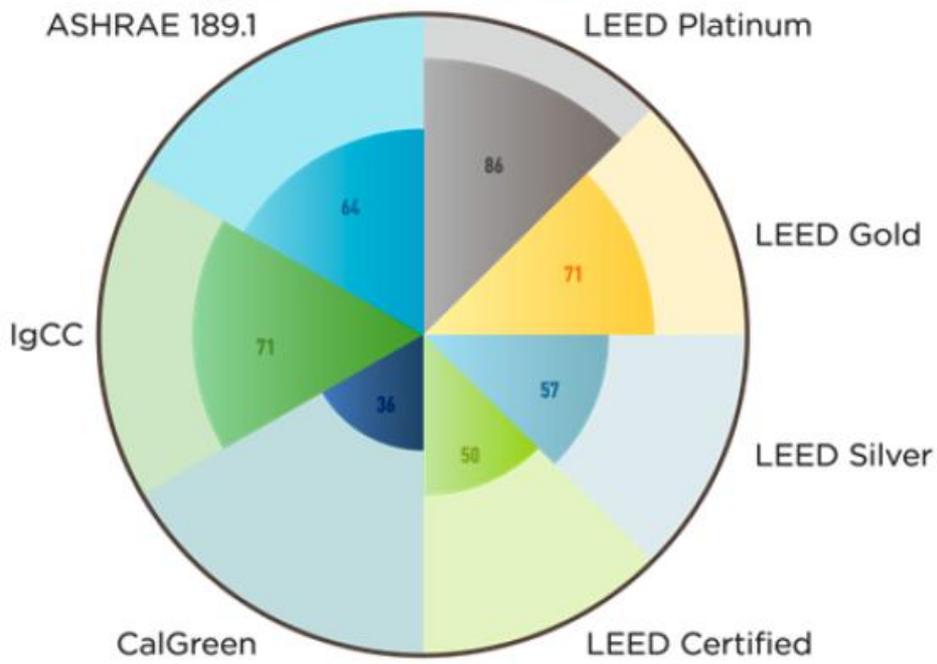
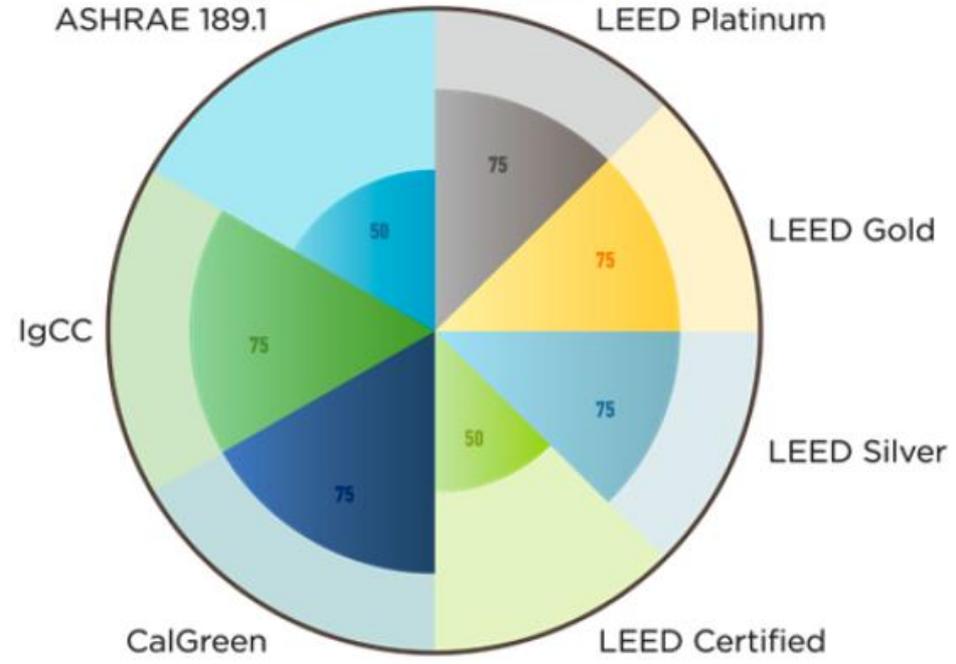


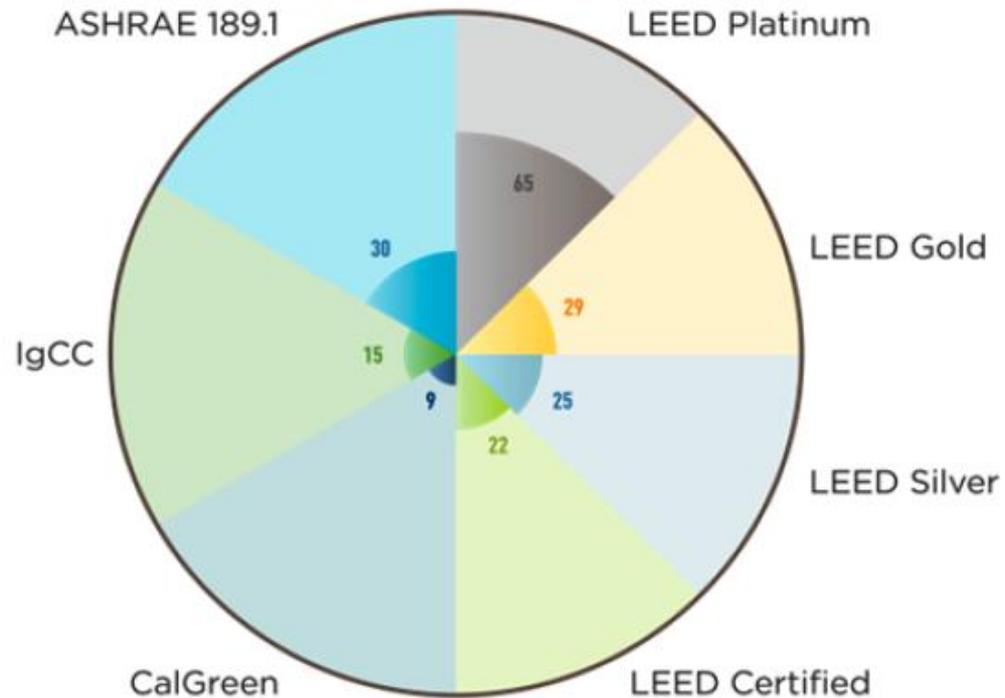
Figure 4. WE Breadth



Reference: Lane Burt and Jeremy Sigmon, USGBC, and Brian Dean and Charlie Haack, ICF International, "Green" Codes and Rating Systems: A Framework for Evaluating the Tools and the Measuring Sticks to Create Better Buildings (ACEEE, 2012), 3-33.

Standard Comparison

Figure 5. EA Breadth



Reference: Lane Burt and Jeremy Sigmon, USGBC, and Brian Dean and Charlie Haack, ICF International, "Green" Codes and Rating Systems: A Framework for Evaluating the Tools and the Measuring Sticks to Create Better Buildings (ACEEE, 2012), 3-34.

Green Building Program Manual

- To be released with the 2013 Construction Codes
- A “living” document
- Broken down into typical project phases:
 - Design
 - Permitting
 - Inspections
 - Certificate of Occupancy
 - Post Occupancy
- Includes Sectional Reference Guide and Submittal Templates to streamline process

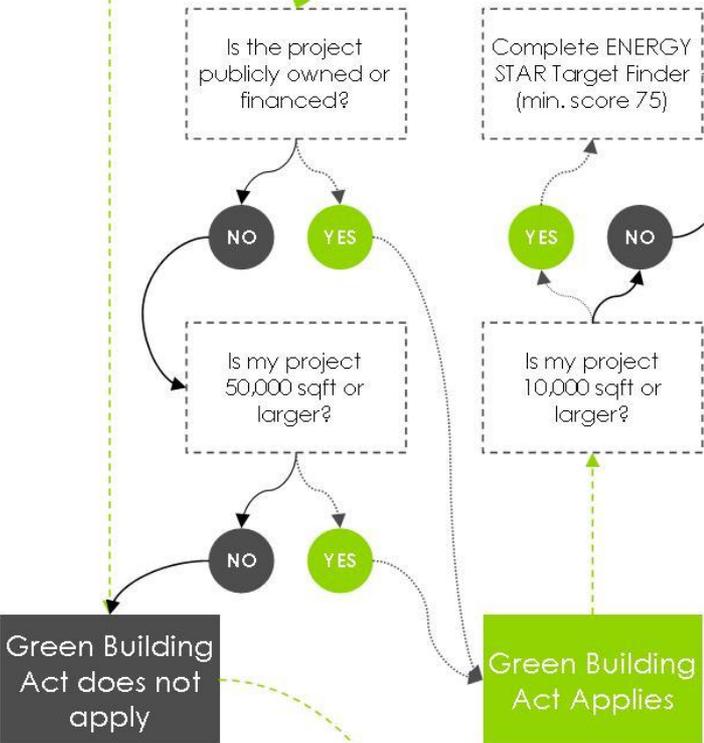


Green Building Program Manual

- Broken down into typical project phases:
 - Design
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GREEN BUILDING ACT

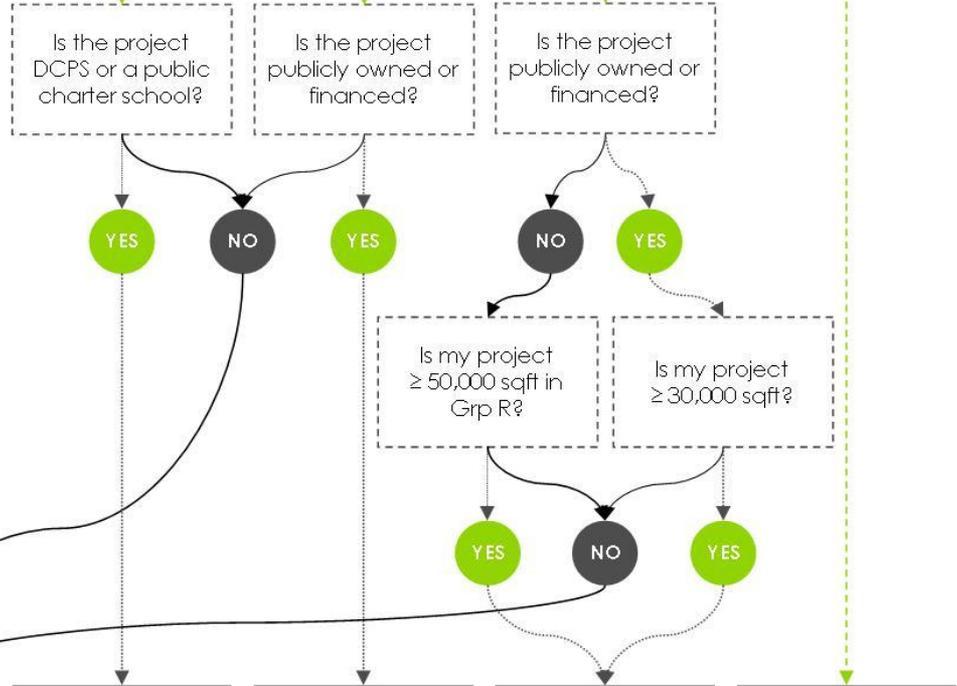
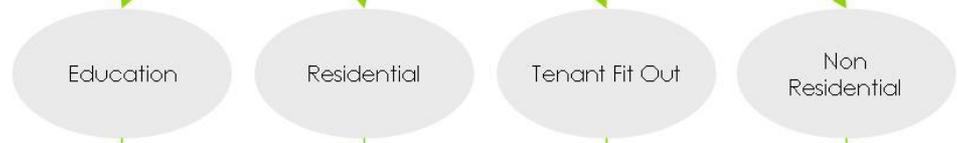
My project is ...



Verify Compliance Requirements of Green Building Code



Define Use :



GREEN CONSTRUCTION CODE

My project is ...



Are you required to comply with the Green Building Act?

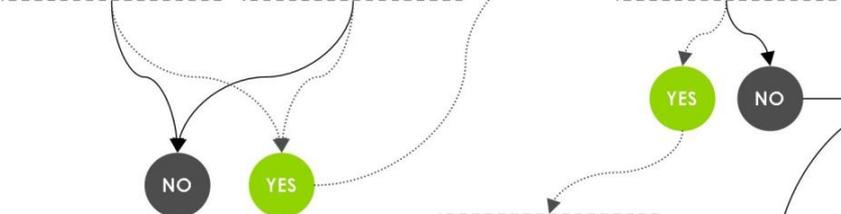
Follow Green Building Act



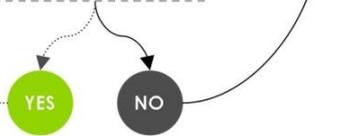
Is my project 1,000 sqft or larger?

Is my project 10,000 sqft or larger?

Is my project residential?



Is my project Single Family or less than 4 stories?



Green Code does not apply

Follow the Green Code

I am going to follow ...

Select one of ...

- ASHRAE 189.1
- Green Communities Certified
- LEED Certified
- NGBS/ICC 700 Bronze

No Required Electives

Select 13 Electives from Appendix A

Select 15 Electives from Appendix A

Is my project a Level 3 Alteration?



Is my project New Construction?



Green Code

Alternate Compliance Path

Green Building Questions?

Green.Building@dc.gov



DEPARTMENT OF CONSUMER & REGULATORY AFFAIRS

Thank you!

Fulya Kocak

Director of Sustainable Solutions
Clark Construction Group, Inc.

Anica Landreneau

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HOK

John Otto

Vice President of Construction Management
Akridge

David Epley

Green Building and Sustainability Coordinator
District Department of Consumer and Regulatory Affairs

